Influence of short-time skin maceration combined with enzyme treatment on the volatile composition of musts from fresh and withered Fiano winegrapes

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AIM: The increasing market competitiveness is promoting the production of special dry wines with distinctive characteristics, obtained either from minor winegrape varieties and/or the inclusion of partially dehydrated grapes. With the aim of taking advantage of the grape quality traits in terms of aroma potential, short-time skin contact prior pressing in combination with the use of exogenous enzymes can facilitate the release of volatile organic compounds (VOCs) into the grape must. In addition, the possible presence of glycosidase activity enhances the hydrolysis of odourless glycosidically-bound precursors, which have a particular importance for non-aromatic grape varieties. [1,2] In this study, the effect of eight enzyme treatments with different single activity during short-term pre-fermentative maceration was investigated on the volatile composition of musts, obtained from both fresh and withered winegrapes cv. 'Fiano'. METHODS: The study was carried out on fresh or partially dehydrated (20% of weight loss) 'Fiano' white winegrapes from Campania region (southern Italy). For each sample, twenty-seven berry sets of 500 g each were randomly selected and crushed in presence of 10 mg/kg of potassium metabisulphite. Then, three berry sets were individually treated with pectin lyase (PL), polygalacturonase (PG), pectin methylesterase (PME), xylanase (XYL), arabinase (ARA), protease (PRO), β-glucanase (GLN), or β-glucosidase (GLU) enzymes at a dose of 10 mg/kg, homogenized and subjected to pre-fermentative maceration for 13 h at 12 °C. The other three berry sets were treated similarly but without enzyme addition (control). Subsequently, the musts obtained were separated from the skins and used for the determination of free and glycosidically-bound VOCs using solid-phase extraction followed by GC-MS analysis [3].RESULTS: Regarding the free volatile fraction of musts, few compounds were influenced by the different enzyme treatments tested. This effect appeared to be more evident for glycosylated volatile compounds, for which the concentration of total compounds, aromatic alcohols, C6 alcohols, and certain terpenes (nerol and geraniol) significantly prevailed in musts from fresh grapes treated with PG. Moreover, samples from withered Fiano grapes treated with PG and ARA were characterized by higher contents of terpenes (cis-8-hydroxylinalool, nerol, geraniol, and α-terpineol), C6 alcohols (trans-2-hexenol and 1-hexenol), and benzenoids (eugenol). CONCLUSIONS: The addition of enzymes during short-term pre-fermentative maceration resulted to have effect mainly on the glycosylated volatile fraction of the musts obtained from fresh and withered grapes. In particular, exogenous enzyme activities such as PG exhibit major influence on the volatile profile of musts derived from fresh and withered 'Fiano' grapes, which could contribute to enhance the sensory perceived aroma of the resulting wines.

Authors: Stefano Boz – University of Torino, Italy,Susana RÍO SEGADE, University of Torino, Italy Stefano BOZ, University of Torino, Italy Mattia MALABAILA, University of Torino, Italy Domen ŠKRAB, University of Torino, Italy Maria Alessandra PAISSONI, University of Torino, Italy Simone GIACOSA, University of Torino, Italy Luca ROLLE, University of Torino, Italy

Email: stefano.boz@edu.unito.it (mailto:stefano.boz@edu.unito.it)

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